

fine indistinct revolving striae; spire very obtuse; umbilicus entirely covered by the reflexed peristome; peristome white, extremely heavy, strongly reflexed. Type A. N. S. Phila.

M. catalinae (Dall) is much larger, with much wider aperture, peristome not so heavy in proportion to size of shell, umbilicus exposed. Apparently nearer to *M. ruficincta* (Newc.) than to *M. beatula*.

M. gabbi (Newc.), from Santa Barbara I., is larger and more globose with reddened peristome.

MUSSEL POISONING IN CALIFORNIA

BY K. F. MEYER

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During the month of July, 1927, 102 people were seriously poisoned and 6 died following the consumption of the large mussel *Mytilus californianus* Conrad, which had been freshly gathered at 14 different beds on the open shore line of the Pacific coast in the vicinity of San Francisco (see text, figure 1). Although the origin of the poison is not definitely established since the investigations are still in progress it is known that (1) the toxic properties of the mollusks are due to a poison, probably a quaternary amine, which is heat stable in acid solutions and which causes motor nerve paralysis. The concentration of the poison as determined by laboratory test may vary in different mussels and different beds. (2) the poison is not formed by bacteria nor due to copper salts from the rocks nor due to the little crab, *Pinnotheres pisum*, which lives in the mantle cavity nor is it induced by parasites such as sponges and starfish. (3) The poisonous mussels were neither located in stagnant and polluted basins nor exposed to the sun for long periods at low tide, but they were subjected to the ebb and flow of the tides; the poison is therefore not due to asphyxiation or post-mortem changes. (4) It is prob-

ably the result of a metabolism disease influenced by the food and spawning condition of the shellfish. (5) Poisonous mussels can not be distinguished from sound mollusks neither by appearance nor behavior on cooking; occasionally a pungent odor may be noted; the "liver" is always large and dark. (6) The shellfish may become poisonous within a few days and may remain so for several weeks. No assurance can be given that the mussels may not acquire the poisonous properties overnight. (7) During the winter months December-March the poison disappeared only to reappear late in March; however, the amount of poison which may be present early in spring is not sufficiently concentrated to cause symptoms on indigestion in an empty stomach. (8) Since it is impossible to examine all the mussel beds along the California shore line it is impossible to establish by laboratory test the absence of poisonous mussels in certain beds and during certain months of the year. From the experiences thus far collected it is quite apparent that the use of mussels on the California coast during the summer months is always connected with some danger. Near Santa Cruz poisoning cases have occurred in two successive years. No assurance can be given that this condition may not repeat itself. People who notice a tingling or numbness around the lips and prickly feeling in the finger tips and toes 30 minutes or longer after they have eaten mussels should empty the stomach by an emetic, purge the intestinal tube by brisk laxatives and call for a physician immediately.

MANLY D. BARBER

It is with sincere regret that we report the death on August 18, 1928, of Manly D. Barber. He was born at DeKalb, Illinois, May 21, 1852. His early education was received at DeKalb, and he later attended a business school at Quincy, Illinois. He evidenced an early interest in nat-